

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing the file through a duplicate handle, the computer-readable storage medium comprising:

stored computer-executable instructions for performing the method, the method comprising:

a server receiving a request from a client through a first channel to open a file residing on the server, the file having state information associated therewith;

in response to the request, the server sending a first handle to the client to use to access data in the file and at least part of the state information associated therewith, the first handle having access rights to the file;

the server sending a resume key to the client by which a duplicate handle may be requested, the duplicate handle having access rights to the file that correspond to the first handle;

receiving the resume key;

the server receiving a new request from the client through a second channel for a duplicate handle to the file the new request being sent with the resume key;

the server sending the duplicate handle to the client in response to receiving the new request for a duplicate handle and the resume key; and

the server providing the client with access to the file via the duplicate handle.

2. (Currently Amended) The computer-readable storage medium of claim 1, wherein the state information includes a mode in which the file is opened.

3. (Currently Amended) The computer-readable storage medium of claim 2, wherein the mode includes at least one of read only, read/write, a lock, and a mode in which the file is opened for exclusive use by the handle and any duplicates thereof.

4. (Currently Amended) The computer-readable storage medium of claim 3, wherein the lock comprises a range that indicates bytes of the file that can only be accessed by the first handle and any duplicates thereof.

5. (Currently Amended) The computer-readable storage medium of claim 1, further comprising authenticating a client that sends any request.

6. (Currently Amended) The computer-readable storage medium of claim 5, further comprising authenticating a server that sends any response.

7. (Canceled)

8. (Currently Amended) The computer-readable storage medium of claim 1, wherein unencrypted information is sent over the first channel and encrypted information is sent over the second channel.

9. (Currently Amended) The computer-readable storage medium of claim 1, wherein the channels pass through a single network interface on a single client.

10. (Currently Amended) The computer-readable storage medium of claim 1, wherein the channels pass through at least two interfaces on a single client.

11. (Currently Amended) The computer-readable storage medium of claim 1, wherein the first channel is disconnected and wherein the file remains open afterwards.

12. (Currently Amended) The computer-readable storage medium of claim 11, wherein the resume key is received after the first channel has become disconnected.

13. (Currently Amended) The computer-readable storage medium of claim 1, wherein the first channel is disconnected and wherein the file remains open afterwards at least until another client requests access to the file.

14. (Currently Amended) The computer-readable storage medium of claim 13, wherein if the other client requests access to the file before a time has expired, the other client is denied access to the file.

15. (Currently Amended) The computer-readable storage medium of claim 13, wherein if the other client requests access to the file after the time has expired, the file is closed and the other client is granted access to the file.

16. (Currently Amended) The computer-readable storage medium of claim 15, wherein the client is informed that the file has been accessed by another client after the client sends the resume key with a request for a duplicate handle.

17. (Currently Amended) The computer-readable storage medium of claim 13, wherein after the resume key is received, the client is informed that the file has not been changed by another client.

18. (Currently Amended) The computer-readable storage medium of claim 1, wherein the request to open the file is sent from a first client and the duplicate handle is sent to a second client.

19. (Currently Amended) The computer-readable storage medium of claim 18, wherein the first client sends the duplicate handle to the second client.

20. (Currently Amended) The computer-readable storage medium of claim 18, wherein the second client receives the duplicate handle from a server that provides access to the file.

21. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing a file through a duplicate handle, the computer-readable storage medium comprising:

stored computer-executable instructions for performing the method, the method comprising:

a client sending a request to a server through a first channel to open a file in a file access mode including data indicative of access rights, the file residing on the[a] server;

the client receiving a first handle to use to access data in the file in accordance with the access rights, the first handle providing access to all or part of any state information associated with the file;

the client receiving a resume key by which a duplicate handle may be requested;

the client sending the[a] resume key to the server with a request for a duplicate handle through a second channel, the duplicate handle having access rights that correspond to the access rights of the first handle;

the client receiving the duplicate handle; and

the client accessing the file via the duplicate handle.

22. (Currently Amended) The computer-readable storage medium of claim 21, further comprising the client requesting the resume key.

23. (Currently Amended) The computer-readable storage medium of claim 21, wherein the resume key is automatically returned.

24. (Currently Amended) The computer-readable storage medium of claim 21, wherein the file is accessed via the first handle over the first channel and the file is accessed via the duplicate handle over the second channel.

25. (Currently Amended) The computer-readable storage medium of claim 24, wherein the second channel comprises a remote direct memory access (RDMA) channel in which data can be transferred from a client to a server without assistance from a central processing unit (CPU) on either the client or the server.

26. (Currently Amended) The computer-readable storage medium of claim 24, wherein the first channel is closed before the second channel is established.

27. (Currently Amended) The computer-readable storage medium of claim 26, wherein the file remains open after the first channel is closed.

28. (Currently Amended) The computer-readable storage medium of claim 21, wherein the file access mode comprises a mode of exclusive use by the handle and any duplicates thereof.

29. (Currently Amended) The computer-readable storage medium of claim 21, wherein the mode comprises an exclusive lock on a range of bytes in the file.

30. (Currently Amended) The computer-readable storage medium of claim 29, wherein the range of bytes is accessed via the duplicate handle.

31. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing the file through a duplicate handle, the computer-readable storage medium comprising:

stored computer-executable instructions for performing the method, the method comprising:

a client requesting to open a file in a mode comprising a set of one or more access rights and associating state information therewith, the file being stored on a server,

the client obtaining a first handle to the file, the first handle capable of accessing the file in accordance with any access right included in the mode, the first handle obtained via a first channel;

the client obtaining a resume key with which to request a duplicate handle, the duplicate handle capable of accessing the file in any way in which the first handle is capable;

closing the first channel and keeping the file open afterwards;

the client sending a request for the duplicate handle together with the resume key, the request being sent via a second channel; and

the client accessing the file via the duplicate handle.

32. (Currently Amended) The computer-readable storage medium of claim 31, wherein closing the first channel comprises a whole or partial network outage that disrupts the first channel.

33. (Currently Amended) The computer-readable storage medium of claim 31, wherein closing the first channel comprises rebooting a machine associated with the first channel.

34. (Currently Amended) The computer-readable storage medium of claim 33, wherein the machine is the comprises a client accessing the file via the first handle.

35. (Currently Amended) The computer-readable storage medium of claim 33, wherein the machine is the comprises a server providing access to the file.

36. (Currently Amended) A computer-readable storage medium having stored computer-executable instructions for use in a system that provides state-full access to a file and for implementing a method for accessing a file through a duplicate handle, the method comprising:

a client using a network redirector to request a first handle to open a file, the request being made via a loopback path, the first handle capable of accessing the file in accordance with any rights granted while opening the file, the file being stored on a server;

after requesting the first handle via the loopback path, the client requesting subsequent accesses to the file through a separate channel;

the client obtaining a resume key with which to request a duplicate handle, the duplicate handle capable of accessing the file in any way in which the first handle is capable; and

the client obtaining using at least the resume key to obtain the duplicate handle to the file and thereafter performing any read or write access to the file via the duplicate handle.

37. (Currently Amended) The computer-readable storage medium of claim 36, wherein a ~~client requests the handles and a server provides the handles and wherein the client and the server both~~ reside on a single machine.

38. (Currently Amended) The computer-readable storage medium of claim 36, wherein the loopback path comprises a transmission control protocol/internet protocol (TCP/IP) stack.

39. (Currently Amended) The computer-readable storage medium of claim 36, wherein the resume key comprises a file identifier that identifies an open file, a time stamp, and a process identifier that identifies a process associated with the resume key.

40. (Currently Amended) The computer-readable storage medium of claim 39, wherein at least part of the resume key provides an index for other state information associated with the file.

41. (Currently Amended) A system for accessing a file through a duplicate handle, comprising:

a client ~~configured to~~ that performs the following steps:

sends a request through a first channel to open a file residing on a server, the file having state information associated therewith;

receives a first handle to the file and a resume key, the first handle having access rights to the file;

sends a request through a second channel for a duplicate handle together with the resume key, the duplicate handle having access rights to the file that correspond to the first handle; and

accesses the file via the first and duplicate handles; and

a plurality of servers associated with a data store, only an active one of the plurality of servers controlling the data store at a time, the plurality of servers configured in a redundant relationship wherein ~~[[when-]]~~ in response to the active server ~~going~~ [[goes]] offline another one of the plurality of servers ~~becoming~~ becomes active and ~~taking~~ takes control of the data store, the data store comprising open files including the file and a data structure including resume keys to obtain duplicate handles for the open files, wherein after the active server goes offline, the other server that becomes active ~~is configured to~~ builds a data structure that is included on the other server and ~~[[to-]]~~ places resume keys stored in the data store therein, so that the other server may provide a duplicate handle in response to a request for the duplicate handle from the client.

42. (Canceled)

43. (Currently Amended) A system for accessing a file through a duplicate handle, comprising:

a client ~~that performs the following steps:~~configured to

sends a request through a first channel to open a file residing on a server, the file having state information associated therewith;

receives a first handle to the file and a resume key, the first handle having access rights to the file;

sends a request through a second channel for a duplicate handle together with the resume key, the duplicate handle having access rights to the file that correspond to the first handle; and

accesses the file via the first and duplicate handles;

a plurality of data stores ~~configured to that~~ operate in a distributed file system; and

a plurality of servers, each server associated with one of the data stores, each server including a data structure comprising resume keys to use in providing duplicate handles for the open files included on the data store associated with the server,

wherein ~~when any of the servers is in~~ response to a first server being notified that it will be taken offline, the first server is configured to send sending data including resume keys from its data structure to a second~~another~~ server and ~~[[tø]]~~ refers any requests for access to files associated with the sent data to the second~~[[øther]]~~ server, the second~~[[øther]]~~ server providing access to the file thereafter, the second~~[[øther]]~~ server incorporating the data into the data structure included on the second~~[[øther]]~~ server, so that the second~~[[øther]]~~ server provides a duplicate handle in response to a request for the duplicate handle from the client.

44. (Canceled)